

REMARKS

Claims 1-35 and 37-43 are pending in the application. Claims 1-35 and 37-43 are rejected. Claims 1, 12, 34, and 40 have been amended. Claim 36 has been canceled. No new matter has been introduced. In view of the foregoing amendments and the following remarks, Applicants respectfully request allowance of Claims 1-35 and 37-43.

AMENDED DRAWINGS

To comply with the Examiner's request, figures 1 and 2 are amended. No new matter is added. Twenty-eight (28) pages of replacement drawings are being submitted and replace any previous drawings submitted.

PRIOR ART REJECTIONS

Claims 1, 9-11, 23-26 and 40 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Hui (US 6,654,417 B1) in view of Chiang et al., A new rate Control Scheme Using Quadratic Rate Distortion NModel, IEEE, 1996, pgs. 73-76. Claims 2, 8, 16, 22, 27 and 33 are rejected as obvious over Hui and Kim (US 5,777,812). Claims 3, 17, 28 and 41 are rejected as obvious over Hui, Kim and Simpson et al. (US 6,724,817 B1). Claims 4, 5, 29-30 and 42-43 are rejected as obvious over Hui, Kim, Simpson et al., and Sugiyama (US 6,940,911 B2). Claims 6-7, 31 and 32 are rejected as obvious over Hui, Chiang et al., Kim and Tsuru (US 6,950,040 B2). Claims 12-15 are rejected as obvious over Hui. Claims 18 and 19 are rejected as obvious over Hui, Kim and Sugiyama. Claims 20-21 are rejected as obvious over Hui, Kim, and Tsuru. Claims 34, 38 and 39 are rejected as obvious over Hui and Sugiyama. Claims 35-36 are rejected as obvious over Hui, Sugiyama and Simpson et al. Claim 37 is rejected as obvious over Hui, Sugiyama, and Tsuru. Applicants respectfully request withdrawal of the outstanding rejections.

CLAIMS 1-11, 19, 30, AND 40-43 DEFINE OVER THE PRIOR ART

Currently amended representative independent claim 1 recites in part:

picture and a transmit buffer fullness indicator representing a quantity of stored previously-coded video data;

The combination of Hui and Chiang does not teach or suggest the rate and quality control system recited in representative claim 1, and independent claim 40, which recites similar subject matter. In particular, the combination of Hui and Chiang does not teach at least a first quantizer

estimator to generate a first quantizer estimate for each picture based on the complexity indicators, a target coding rate calculated for each picture **and a transmit buffer fullness indicator representing a quantity of stored previously-coded video data**. As teaching the transmit buffer fullness element, the Examiner cites the following from Hui:

...where $D_{I,P,B}$ is **virtual** buffer fullness of corresponding I-, P-, or B-picture, updated (after coding each MB) by the difference between the bits used by the MB and the bits allocated to the MB based on the corresponding $T_{I,P,B}$...

(Hui, 9:30-34). (Emphasis Applicants'). Applicants respectfully disagree. The buffer referenced by Hui with respect to determining a reference quantization step size is a **virtual** buffer, not a **transmit** buffer as disclosed in the subject claim. Hui does disclose a transmit buffer, but it plays no role in determining quantization estimates: "The encoded bitstream is stored in an **output buffer** 207 of the encoder for output at 208 at desired data rates." (Hui, FIG. 2, 8:63-65). (Emphasis Applicants'). The Examiner cites also another section of Hui as teaching this element, which section recites in part:

The bit allocation module 312 and the rate controller 315 take the updated BR_{target} from the target bitrate estimator 322 and perform necessary bit allocation and bit rate control such that the resulting compressed moving picture bitstreams will have encoded bit rate close to BR_{target} . Existing techniques of VBV (video buffer verifier) underflow detection and protection may be applied using BR_{max} as the reference bit rate to ensure the maximum bitrate of the output bitstream is not violated.

(Hui, 13:7-33). Applicants respectfully disagree. Neither this passage nor any other passage in Hui teaches a transmit buffer fullness indicator being used as a basis for the first quantizer estimator.

Because the combination of Hui and Chiang does not teach or suggest the above limitations, the combination does not render representative claim 1 obvious under § 103. Accordingly, Applicants believe that the rejections of independent claims 1 and 40 should be reconsidered and withdrawn. Claims 2-11 depend from independent claim 1 and are allowable for at least the reasons applicable to claim 1, as well as due to the features recited therein. Claims 41-43 depend from independent claim 40 and are allowable for at least the reasons applicable to claim 40 as well as due to the features recited therein.

Also, at least dependent claim 5, and dependent claims 19, 30, and 43, which recite subject matter similar to claim 5, define over the prior art. Representative dependent claim 5 recites:

The rate and quality control system of claim 2, further comprising
a coding policy unit, to determine when it becomes necessary to eliminate motion vectors according to a rate control policy, and
wherein the AVC coder includes a prediction circuit that generates motion vectors for prediction of video data of macroblocks in the input pictures and of video data for sub-blocks therein of various sizes, the prediction circuit responsive to control from the coding policy unit, to **eliminate selected motion vectors from an output coded bitstream.**

The combination of Hui, Chiang, Kim, Sugiyama, and Simpson does not teach or suggest the above-highlighted elements of representative claim 5. In particular, the combination of Hui, Chiang, Kim, Sugiyama, and Simpson does not teach at least a coding policy unit, to determine when it becomes necessary to eliminate motion vectors according to a rate control policy. The Examiner cites various passages from Simpson as teaching this element, however Simpson is directed to adaptive *image* – not *video* – data compression, and consequently makes no mention of *motion* in any respect.

The Examiner cites also Sugiyama as teaching the prediction circuit responsive to control from the coding policy unit, to eliminate selected motion vectors from an output coded bitstream. Applicants respectfully disagree. While Sugiyama may teach eliminating *frames*, he does not teach eliminating *motion vectors*.

For at least these reasons, Applicants believe that the rejections of claims 5, 19, 30, and 43 should be reconsidered and withdrawn.

CLAIMS 12-22 DEFINE OVER THE PRIOR ART

Currently amended independent claim 12 recites:

Rate and quality control system for an AVC-based video coder, comprising:
a content characteristics and coding rate analyzer, responsive to pictures from an input video sequence, to generate complexity indicators representative thereof,
a target bits computer, responsive to the complexity indicators and to a picture type signal, to calculate a target coding rate for each picture in the video sequence,
a buffer based quantizer computer, responsive to the target coding rates, to a transmit buffer indicator signal and to the picture type signal, to generate a buffer-based quantizer estimate for each picture, and
an activity based quantizer computer to calculate activity of each picture in the video sequence and modify the buffer-based quantizer estimate in response thereto,
an AVC coder including a forward quantizer operative according to the modified buffer-based quantizer estimate.

The combination of Hui does not teach or suggest the rate and quality control system recited in claim 12. In particular, Hui does not teach at least a buffer based quantizer computer, responsive to the target coding rates, to a transmit buffer indicator signal and to the picture type signal, to generate a buffer-based quantizer estimate for each picture. Please see relevant discussion above in conjunction with claim 1.

Given that Hui does not disclose a buffer-based quantizer computer as described in the subject claim, Hui cannot disclose an activity based quantizer computer to calculate activity of each picture in the video sequence **and modify the *buffer-based quantizer estimate*** in response thereto. Similarly, Hui also cannot disclose an AVC coder including a forward quantizer operative according to the ***modified buffer-based quantizer estimate***.

For at least these reasons, Applicants believe that the rejection of claim 12 should be reconsidered and withdrawn. Claims 13-22 depend from independent claim 12 and are allowable for at least the reasons applicable to claim 12, as well as due to the features recited therein.

CLAIMS 23-33 DEFINE OVER THE PRIOR ART

Independent claim 23 recites in part:

a rate model quantizer estimator, responsive to quantizers and coding rates of previously-coded pictures and to picture type indicators of input pictures, to estimate quantizer parameters of the input pictures according to a linear regression analysis, **wherein linear regression coefficients of input I pictures are selected according to the complexity indicators for such I pictures,**

The combination of Hui and Chiang does not teach or suggest the rate and quality control system recited in claim 23. In particular, the combination of Hui and Chiang does not teach at least wherein linear regression coefficients of input I pictures are selected according to the complexity indicators for such I pictures. Nowhere does Hui or Chiang disclose selecting linear regression coefficients of input I pictures ***according to complexity indicators***.

For at least these reasons, Applicants believe that the rejection of claim 23 should be reconsidered and withdrawn. Claims 24-33 depend from independent claim 23 and are allowable for at least the reasons applicable to claim 23, as well as due to the features recited therein.

CLAIMS 34-45 AND 37-39 DEFINE OVER THE PRIOR ART

Currently amended independent claim 34 recites in part:

wherein the video coding chain deletes motion vectors under control of the rate controller.

The combination of Hui, Sugiyama, and Simpson does not teach or suggest the video coding system recited in amended claim 34. In particular, the combination of Hui, Sugiyama, and Simpson does not teach wherein the video coding chain deletes motion vectors under control of the rate controller. Amended claim 34 recites subject matter similar to claims 5, 19, 30, and 43, and Applicants direct the Examiner to the above arguments (pages 12-13) regarding those claims.

For at least these reasons, Applicants believe that the rejection of claim 34 should be reconsidered and withdrawn. Claims 35 and 37-39 depend from independent claim 34 and are allowable for at least the reasons applicable to claim 34, as well as due to the features recited therein.

CONCLUSION

In view of the above amendments and arguments, it is believed that the above-identified application is in condition for allowance, and notice to that effect is respectfully requested.

Should the Examiner have any questions, the Examiner is encouraged to contact the undersigned at (408) 975-7963.

The Commissioner is authorized to charge any fees or credit any overpayments which may be incurred in connection with this paper under 37 C.F.R. §§ 1.16 or 1.17 to Deposit Account No. 11-0600.

Respectfully submitted,

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